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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
09/632,891	08/07/00	MUNSON C	UMMG-1544-C

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LINDA M DESCHERE
YOUNG & BASILE PC
3001 WEST BIG BEAVER ROAD
SUITE 624
TROY MI 48084

EXAMINER	
NGUYEN, T	
ART UNIT	PAPER NUMBER
1764	4

DATE MAILED: 04/24/01

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trad marks

Office Acti n Summary	Application No. 09/632,891	Applicant(s) MUNSON ET AL.	
	Examiner Tam M. Nguyen	Art Unit 1764	

-- The MAILING DATE of this communication appears on th cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *07 August 2000* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-32* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *15-25* is/are allowed.

6)☒ Claim(s) *1-14 and 26-32* is/are rejected.

7)☒ Claim(s) *29-32* is/are objected to.

8)☐ Claims _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are objected to by the Examiner.

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

15) ☒ Notice of References Cited (PTO-892)
16) ☒ Notice of Draftsperson's Patent Drawing Review (PTO-948)
17) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2 .
18) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
19) ☐ Notice of Informal Patent Application (PTO-152)
20) ☐ Other: .

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-7 and 10-14 rejected under 35 U.S.C. 103(a) as being unpatentable over Ogawa et al. (6,042,797) in view of "New Sorbents for Olefin/paraffin separations by adsorption..." Ralph T. Yang and E.E. Kikkinides, AIChE Journal, March 1995, Vol.41, No.3, pp.509-517. (Yang)

Ogawa discloses a process for removing ethylene from a gas mixture containing ethylene and a sulfur compound (e.g., sulfur oxide) by contacting the gas mixture with an adsorbent which comprises a silver compound (silver nitrate) and zeolite. The desorbing step is operated at a temperature from 200 to 300^0 C and the adsorption step is operated at a higher temperature than the desorbing temperature. The pore size of the adsorbent ranges from 3.4 to 5.5 Å. It is noted that Ogawa does not specifically disclose that the carrier comprises a monolayer of a silver compound on the adsorbent surface. However, it is optional that only silver compound is impregnated on the adsorbent. Therefore, the limitation is embraced by the reference. It is also noted that the reference does not disclose that the retaining of the alkene is accomplished by formation of π-complexation bonds. However, it is known that the bonds between the silver compound and alkene occur by π-complexation bonds. (See col. 2, line 59 through col. 8, line 7)

Ogawa does not disclose that silver compound is dispersed on the adsorbent, does not disclose the silver compound is silver halide and the carrier is silica which has a surface area between 50 to 2,000 m^2/g.

Yang discloses a process for separating ethylene/propylene from a paraffinic feed. The feed is passed into an adsorption zone which contains an adsorbent. The adsorbent comprises a silica support and silver salt (e.g., $AgNO_3$, AgCl), and has a surface area of 340 m^2/g wherein the silver compound is dispersed on the adsorbent. (See the entire document)

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the Ogawa process by dispersing the silver compound on the carrier as taught by Yang because Yang discloses that it is effective to remove alkene when using a adsorbent wherein a silver compound is dispersed on the adsorbent.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the Ogawa process by utilizing the absorbent of Yang (which is the same as the claimed adsorbent) because the adsorbent of Yang is effective in a process for removing alkene in a gas mixture.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the Ogawa process by using a silver halide as a silver compound because Yang discloses that silver halide and silver nitrate have an equivalent function is the process of removing alkene from and gas mixture.

Claims 8 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over the references as applied to claims 1-7, and 10-14 above, and further in view of Ramachandran et al. (5,744,687).

Ogawa does not disclose the operating temperatures and pressures.

Ramachandran discloses a method of separating gaseous alkene (e.g., ethylene) from a gaseous alkane by an adsorption process. The adsorbent comprises a support (selected from molecular sieve, alumina, silica or zeolites), which has a pore size from about 3.6 to 4 Å, and which is ion exchanged with Ag^+ and/or Cu^+. The adsorption process is operated at a temperature ranging from 50 to 250^0 C and at a pressure from about 0.2 to aboút 100 bar (0.197 - 99 atm). The desorption step is operated at a temperature from about 100 to 350^0 C and at a pressure from about 20 to 5000 millibars. (see col. 1, lines 48 through col. 5, lines 52)

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the Ogawa process by utilizing the adsorption and

desorption operating conditions of Ramachandran because the Ramachandran conditions are effective to adsorb and desorb ethylene/propylene.

Claims 26-28 are rejected under 35 U.S.C. 103(b) as being unpatentable over Milton (2,882,243).

Milton discloses a process of adsorbing butadiene from a hydrocarbon feed mixture containing butene by using an A-zeolite adsorbent which comprises alkali and alkaline earth metal cations. The adsorbing occurs at a temperature around 25 to 100 ^{0}C and at about 200 mmHg pressure. The adsorbent is activated by heating it at a reduced pressure to remove adsorbed materials. (See col. 4, lines 20-25; col. 6, line 50; col. 12, lines 7-11; col. 15, lines 1-11; col. 20, lines 10-39)

Milton does not disclose the pressures and temperatures in the desorption step, and does not disclose that sulfur compounds are contained in the feedstock.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the Milton process by desorbing butadiene from the adsorbent at a temperature from about 70 to 120 ^{0}C at a pressure from 0.1 to 5 atm because Milton's adsorption temperature for butadiene is about 25 ^{0}C and Milton also discloses that the conditions used for desorption of an adsorbate from zeolite A vary with the adsorbate and include raising the temperature and/or reducing the pressure. Therefore, it would be effective to operate the desorption step by utilizing a temperature higher than 25^0 C (e.g., 70^0 C) and at a lower pressure (e.g.,1 atm) in the process of Milton.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the Miton process by utilizing a feedstock containing a

tiny amount of hydrogen sulfide (e.g., 0.01 ppm) because it would be expected that the tiny amount of hydrogen sulfide present in the feedstock of Milton would not affect the outcome of the process of Milton.

Allowable Subject Matter

Claims 15-25 are allowed.

Claims 29-32 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter:

No prior art of record discloses or renders obvious a process for separating a diene from a mixture including the diene and sulfur compound by contacting the mixture with a zeolite adsorbent wherein essentially all cationic sites of the ion-exchanged zeolite contain silver cation or copper cation and the diene is adsorbed onto the adsorbent by π-complexation as called for in claim 15.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tam M. Nguyen whose telephone number is (703) 305-7715. The examiner can normally be reached on Monday through Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Marian Knode can be reached on 703 308 4311. The fax phone numbers for the

organization where this application or proceeding is assigned are (703) 305-5408 for regular communications and (703) 305-3599 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

Tam Nguyen/ TN
April 20, 2001

Walter D. Griffin
Primary Examiner